

TEMPORAL LOBE EPILEPSY:
NEUROSURGICAL ASPECTS*

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At the inception of this project it was agreed by the two surgeons involved (J.L.P. and J.R.) to carry out a "standard" temporal lobectomy. All patients were first studied by our neurological collaborators in order to establish the diagnosis of temporal lobe epilepsy, to establish the fact that the patient was refractory to medication and, finally, to establish unilateral predominance of the electroencephalic abnormality. The patients were studied by pneumoencephalography, and usually by carotid arteriography as well, in order to outline any gross pathology, if such existed. On the other hand, the presence of ventricular dilatation, or other signs of focal atrophy, were not deemed essential in selecting a patient for surgery. The final decision to subject the patient to temporal lobectomy was made at a conference involving all disciplines cooperating in the study.**

An integral aspect of the project was, of course, a careful pre- and postoperative psychiatric and psychological evaluation of the patients in an attempt to determine what, if any, was the nature of the personality alteration seen following temporal lobectomy. Most authorities have expressed themselves to the effect that this procedure is not a psychosurgical operation and that any nonictal psychiatric disorders are hence not altered by lobectomy. While this aspect of the problem will be dis-

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** Our discussor, Dr. Rayport, will amplify on the indications for surgery.

STANDARD TEMPORAL LOBECTOMY

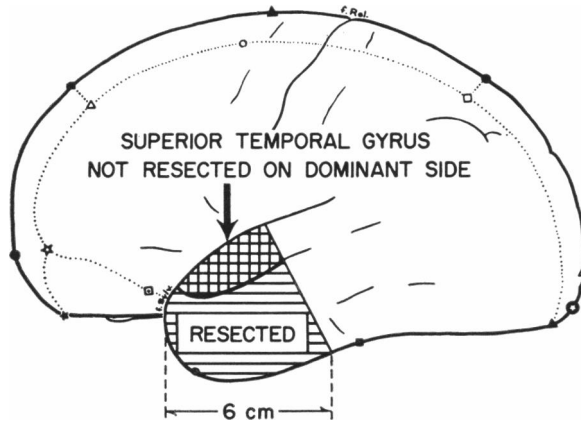


Fig. 1. Diagrammatic representation—lateral view of temporal lobe section.

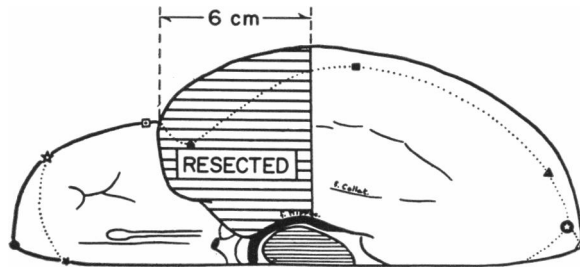


Fig. 2. Diagrammatic representation—inferior view of temporal lobe resection.

cussed by our psychiatric colleagues, we would just like to say that this represented one of the major areas about which this study was organized.

The standard procedure agreed upon (Figures 1 and 2) consisted, on the nondominant side, of a lobectomy measuring six to seven centimeters from the temporal tip and including the hippocampus and uncus medially. The tip of the horn of the ventricle was always entered. The superior temporal gyrus was removed in the excision, this procedure being altered in the dominant hemisphere by leaving all but the anterior two centimeters of the superior temporal gyrus. It was also altered to

include excision of any possible gross pathology found, such as definite areas of scarring, or an unexpected glioma or vascular malformation.

While surface and depth recordings, and pre-excision and marginal recordings were obtained, following the lobectomy no attempt was made to alter significantly this protocol in order to excise additional areas of spiking. Electrical stimulation was also employed in the region of the abnormal EEG foci to observe the electroencephalographic and physiological responses. To this point, in the "Temporal Lobe Epilepsy Symposium" held at the National Institutes of Health in 1957,¹ Falconer expressed the opinion that, provided the preoperative EEG studies were adequate, this type of surgery could be done without electrocorticographic studies, an opinion concurred in by Walker. We mention this only to point out that most surgeons working in this field also tend to carry out fairly standard excisions.

The surgical experiences reported here are based on 21 patients studied as a group between September 1958 and March 1961, of whom 18 were available for analysis. The high incidence (35 per cent) of tumors or other specific pathological processes probably reflects the type of patient material attracted to the New York Neurological Institute.

The following case summaries are representative of the type of material dealt with by surgery.

CASE J. MCC. This 12-year old girl was admitted to the hospital with a seven-year history of psychomotor epilepsy. In spite of intensive anticonvulsant therapy she continued to have frequent seizures and in the two years preceding her admission her personality deteriorated, and she was subject to frequent bursts of temper tantrums.

Neurological examination was negative. EEG studies showed an abnormal focus in the right temporal lobe, with some firing from the left as well. Spinal fluid protein was normal as was a pneumoencephalogram.

At craniotomy a small cyst 2 cm. in diameter was found just in front of and lateral to the tip of the right temporal horn. A "standard" temporal lobectomy was carried out.

Pathological report on the tissue removed was that of mixed astrocytoma and oligodendroglioma. She received a course of radiotherapy (4000 r. total dose) in 30 days during the postoperative period.

Follow-up: Up to this time the child has done very well. There was an immediate improvement in her personality and she has had no further psychomotor seizures. It is now 24 months since operation and she is on a main-

tenance dose of Dilantin.

CASE II. E. K. This 41-year old female was admitted with an intractable seizure problem. The patient had her first seizure at age 19, at which time she was a student nurse. This consisted of an episode of unconsciousness preceded by bilateral humming noises. She had had similar episodes over the preceding few years. Apparently some of these were *grand mal* with tongue-biting and tonic-clonic movements, but these latter were infrequent, with episodes occurring several years apart.

For ten years prior to admission she had suffered from only one type of spell, which consisted of sudden loss of consciousness with a fall, if she were standing. For a period of 30 to 60 seconds she was completely atonic, followed by little or very brief drowsiness. During her hospital admission in the summer of 1960, a resident physician witnessed and recorded a seizure as a sudden cessation of conversation, throwing both arms up, the right before the left, extension of the neck, flexion of thighs and knees, closing of the eyes and heavy breathing. After ten seconds the tongue protruded and there were chewing movements for another fifteen seconds. She was confused for several seconds following the episode.

Neurological examination was negative except for a decrease in the left nasolabial fold and a lag of the left side of the mouth. The patient was somewhat euphoric, vague and at times hypomanic. EEG studies suggested a right temporal focus, reinforced by Metrazol activation. Arteriography and pneumoencephalography were normal.

At craniotomy a "standard" right temporal lobectomy was carried out. A spike focus was found well within the area of the excision.

Pathological report: Normal temporal lobe.

Follow-up: Her postoperative course was smooth and in the first six months since surgery she had no further psychomotor seizures. She is being maintained on Dilantin 100 mg. q.i.d., and is now having very occasional, mild attacks.

Results: When results are correlated with the type of pathology found, it can be seen that good results may be expected when a grossly recognizable area of disease can be excised (Table I). (The criteria for evaluating results have been discussed in Dr. Goldensohn's paper.) Here "good results" signify over 75 per cent improvement and "poor", less than 75 per cent improvement.

It will also be seen (Table II) that leaving the upper bank of the superior temporal gyrus on the dominant hemisphere did not seem to militate against a good result in this small series of patients.

The results in our group of patients, the most recent having been followed for only eight months are, at this early date, comparable or

TABLE I.—RESULTS

| | <i>Good</i> | <i>Poor</i> |
|--|-------------|-------------|
| a. <u>No Pathology</u> | 3 | 4 |
| b. <u>Gliosis — Nonspecific</u> | | |
| In area of excision | 3 | |
| Also remaining after excision | | 1 |
| c. <u>Specific Pathology</u> | | |
| Old abscess completely excised | 1 | 1 |
| Thrombosed angioma | 1 | 1 |
| d. <u>Astrocytoma or Mixed Gliomas</u> | | |
| In area of excision | 4 | |

TABLE II.—SIDE OF LOBECTOMY
(all patients right-handed)

| | <i>Right</i> | <i>Left</i> |
|------------|--------------|-------------|
| Good | 11 | 2 |
| Poor | 3 | 2 |

slightly better than other somewhat larger series. At this time, 12 of 18, or over 60 per cent, are markedly improved. As in other studies, most of these patients have been continued on anticonvulsant medication during the postoperative period, generally in reduced amounts. We have had no patients develop *grand mal* seizures who did not have them preoperatively. At the 1957 Symposium,¹ Bailey reported 13 patients improved of 40 treated by lobectomy, while Rasmussen listed 40 per cent cured and 15 per cent improved in a series of 217 patients following temporal lobectomy. In our series we had no operative deaths, although one patient died two months following lobectomy of coronary thrombosis. One patient developed osteomyelitis of his bone flap requiring a second craniotomy. One patient developed an "aseptic meningitis" which subsided without antibiotics. There were no other serious complications.

Temporal lobectomy for psychomotor seizures is a procedure with little or no mortality and slight morbidity. Many patients, however, even if relieved of their frank seizures, still have severe personality problems. It would appear that the very best results are obtained in instances where a frankly pathological lesion is so located that it falls within the limits of a standard temporal lobectomy.

SUMMARY

J. LAWRENCE POOL: With respect to the surgical therapy of temporal lobe epilepsy I should like, in summary, to stress the importance of five principles:

1. Behavior problems in children or young adults, manifested by sudden rage attacks, should suggest the possibility of temporal lobe epilepsy that may be benefitted by surgery.
2. Temporal lobe surgery should not be done unless a thorough trial of drug therapy has first been made.
3. It is also essential that *repeated* electroencephalographic studies clearly indicate unilaterality of electroencephalographic abnormality as to the origin and predominance of such abnormalities. The fact that some degree of electroencephalographic changes may be mirrored by the opposite temporal lobe or other parts of the brain does not preclude surgery.
4. Temporal lobe surgery should be preceded by pneumoencephalography to determine whether a brain tumor or cerebral atrophy is present, and by carotid angiography to detect any arteriovenous malformation (or cerebral angioma).
5. The possibility of a brain tumor, perhaps too small to be detected by such preliminary studies, should also always be kept in mind.

REFERENCE

1. *Temporal Lobe Epilepsy*, B. Maitland and P. Bailey, eds. Springfield, Ill. C. C. Thomas, 1958.